

## NATIONAL TRANSPORTATION SAFETY BOARD

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IN RE: :  
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THE EL FARO INCIDENT OFF : NTSB Accident No.  
THE COAST OF THE BAHAMAS ON : DCA16MM001  
OCTOBER 1, 2015 :  
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Interview of: JOHN R. FROST  
JOHN P. SQUIRES

Wednesday,  
June 15, 2016

U.S. Coast Guard  
Portsmouth, Virginia

## BEFORE:

JON FURUKAWA, NTSB  
PAUL WEBB, U.S. Coast Guard  
LT. [REDACTED] JAG Corps  
JEFFERY S. BROWN, ESQ., Mantech

This transcript was produced from audio  
provided by the National Transportation Safety Board.

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JOHN R. FROST AND JOHN P. SQUIRES

TAKEN ON

WEDNESDAY, JULY 15, 2016

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If, to the best of your knowledge, no corrections are needed kindly circle the statement "no corrections needed" and initial in the space provided.

NO CORRECTIONS NEEDED.

  
Initials

John P. Sawyer  
Printed Name of Person providing the above information

  
Signature of Person providing the above information

08/15/16  
Date

P-R-O-C-E-E-D-I-N-G-S

(2:28 p.m.)

MR. FURUKAWA: It is Wednesday the 15th of June, 2016. We're at the Coast Guard C3 Engineering Center in Portsmouth, Virginia. The time is 1428, and we're here to interview Mr. John R. Frost, the SAR Ops program manager from Coast Guard headquarters, and we'll just call you Jack, and Mr. John P. Squires, the senior field engineer here at C3CEN.

I'm Jon Furukawa with the NTSB, and we'll just go around the room and introduce yourself. State your name and who you represent for the transcriber.

MR. WEBB: Paul Webb, U.S. Coast Guard.

MR. FROST: Jack Frost, U.S. Coast Guard.

MR. [REDACTED] [REDACTED] U.S. Coast Guard representing the witnesses.

MR. SQUIRES: John Squires, Mantech International.

MR. REDAK: Bill Redak (phonetic), Mantech International.

MR. FURUKAWA: And on the phone?

MR. BROWN: Jeff Brown, general counsel, Mantech, representing the employer of John Squires.

MR. FURUKAWA: Okay. And Mr. Frost and Mr. Squires, do you acknowledge that this interview is

1 being recorded?

2 MR. FROST: Yes.

3 MR. SQUIRES: Yes.

4 MR. FURUKAWA: And do you acknowledge that  
5 we've discussed the NTSB mandatory briefing items?

6 MR. FROST: Yes.

7 MR. SQUIRES: Yes.

8 MR. FURUKAWA: With that, let me start off  
9 first with MR. FROST. Can you -- your professional  
10 background?

11 MR. FROST: Well, the part that's pertinent  
12 to this is 23 years active service with the Coast Guard  
13 starting in 1971 with Officer Candidate School.  
14 Eighteen months aboard cutter Taney, three years at the  
15 rescue coordination center in San Juan, Puerto Rico,  
16 then five years as the computer-assisted search  
17 planning senior analyst in New York, postgraduate  
18 school in computer science, back to Governor's Island  
19 as the assistant chief of search and rescue for land  
20 area, and executive officer followed by commanding  
21 officer of the Operations Computing Center, which  
22 became the Operations System Center in Martinsburg,  
23 after I left New York.

24 And then the last couple of years was in the  
25 research and development center in Groton, Connecticut

1 for the Coast Guard. And then I've worked -- I've  
2 spent ten years in the Washington, D.C. area working  
3 for a couple of different contractors, mostly on U.S.  
4 Coast Guard search and rescue work. And now I'm a  
5 government civilian at Coast Guard headquarters in the  
6 Office of Search and Rescue for the rest of me bloomin'  
7 life.

8 MR. FURUKAWA: So how many years Coast Guard  
9 and active duty?

10 MR. FROST: Put it all together, it's over  
11 40.

12 MR. FURUKAWA: Over 40. And Jack, your age,  
13 please?

14 MR. FROST: Sixty-nine.

15 MR. FURUKAWA: Okay. And your highest  
16 education?

17 MR. FROST: Master's degree in computer  
18 science, bachelor's in mathematics.

19 MR. FURUKAWA: Is that at the Coast Guard  
20 Academy?

21 MR. FROST: Please. No, I'm an alumnus of  
22 Florida State University. I spent a couple of years  
23 teaching high school, then joined the Coast Guard  
24 through Officer Candidate School.

25 MR. FURUKAWA: And your position right now

1 is the SAR Ops program manager. Can you describe your  
2 duties for this job?

3 MR. FROST: It's primarily overseeing SAR  
4 Ops and assisting with writing policy. Technically we  
5 are a policy shop. I'm a little more technical than  
6 that, but that's basically what I do.

7 MR. FURUKAWA: And for Mr. Squires, can you  
8 tell me what your professional background, your age,  
9 highest level of education, all that?

10 MR. SQUIRES: I'm 52. My highest formal  
11 education is high school; the rest is military service  
12 and technical schools. I enlisted in the Coast Guard  
13 at the age of 18. I went to radio and A (phonetic)  
14 school, then went to electronics technician school.

15 Did eight years at the electronics  
16 engineering center in Wildwood, New Jersey working on a  
17 vessel traffic service system as an electronics  
18 technician and installation lead. I retired from the  
19 Coast Guard cutter Legare, having done five different  
20 ships, in 2002 as an E-6, and then I went to work for  
21 Allied Technology Group, Inc as a depot and  
22 installation technician, and then moved to the current  
23 position supporting search and rescue software and IT  
24 development, or IT support.

25 My current duties are, I am the IT technical



1 lead for the SAR Ops project. I do all the IT  
2 infrastructure, the operating system environments, and  
3 the deployment of the SAR Ops software. I'm also  
4 involved with testing, and I'm one of the two primary  
5 support technicians for the Coast Guard.

6 MR. FURUKAWA: How many years active duty  
7 were you?

8 MR. SQUIRES: Twenty years.

9 MR. FURUKAWA: Twenty years. So how many  
10 years on total active duty and civilian?

11 MR. SQUIRES: This is 2016; it would be  
12 nearly 40.

13 MR. FURUKAWA: Forty?

14 MR. SQUIRES: Yes. Twenty plus twelve --  
15 yes. Thirty-three. Sorry.

16 MR. FURUKAWA: Thirty-three?

17 MR. SQUIRES: Can't add.

18 MR. FROST: I'm a mathematician; I can't do  
19 arithmetic, either.

20 MR. FURUKAWA: Okay. And any other  
21 background questions for the interviewees?

22 MR. WEBB: No. I wanted to start out with  
23 Jack.

24 MR. FURUKAWA: Okay, so let's just go with -  
25 -

1 MR. FROST: That's why you invited me here.

2 MR. FURUKAWA: We'll turn it over to Paul  
3 Webb with the Coast Guard.

4 MR. WEBB: This is Paul Webb. So Jack,  
5 first I want to kind of get down the history of SAR  
6 Ops, so just a few, six questions here on that. SAR  
7 Ops, how long has it been operational now?

8 MR. FROST: We went operational, I believe  
9 it was January 2007, I think. We've been in  
10 development since October of 2003, I believe is when we  
11 started.

12 MR. WEBB: The program has had how many  
13 upgrades since it was first deployed?

14 MR. FROST: Define upgrade.

15 MR. WEBB: Version one --

16 MR. FROST: Version -- I don't know. John  
17 would have a better handle on that. I can't remember  
18 all the version numbers.

19 MR. SQUIRES: We started with version 1.0,  
20 went all the way through 1.4, and then went through  
21 2.0, and the current version is 2.02.

22 MR. WEBB: And we're looking at 2.03, and  
23 that's July?

24 MR. FROST: That's the current schedule;  
25 yes.

1 MR. WEBB: Condensed version, explain how  
2 SAR Ops works. What was it built on, the program that  
3 it's based on, and then the Coast Guard app on top?

4 MR. FROST: Okay. SAR Ops is built as an  
5 extension to ArcGIS, which is a commercial off-the-  
6 shelf product by Esri, environmental research something  
7 institute.

8 MR. SQUIRES: Environmental Systems Research  
9 Institute.

10 MR. FROST: Yeah, okay. Environmental  
11 Systems Research Institute. It's a widely used  
12 geographic information system. We use it for all the  
13 background displays, the maps, charts. It's very  
14 capable at putting geospatial data onto a screen, which  
15 is one of the reasons that we chose it.

16 The Coast Guard piece itself, the extension,  
17 is a Monte Carlo simulation, and by that, it means that  
18 essentially what we do is, we simulate the movements of  
19 literally thousands of simulated search objects to find  
20 out where most of them are going to go by the time we  
21 are ready to get search assets out there, so that we  
22 can optimally allocate the assets and maximize the  
23 chances of finding the search objects that we're  
24 looking for.

25 So Monte Carlo comes from the notion that

1 we're making random draws from the environment to get  
2 the winds so that each one of these drift trajectories  
3 is an independent sample. So we're getting independent  
4 draws from the wind, independent draws from the  
5 currents, independent draws for starting position,  
6 starting time, independent draws for what kind of an  
7 object it is.

8 We can simulate up to four search object  
9 types simultaneously. Because very often, in this  
10 business, you don't know exactly what it is you're  
11 looking for. You know a vessel was in trouble, but you  
12 don't know if you're looking for people in the water or  
13 life rafts, lifeboats, or maybe the vessel itself.

14 And by doing all this, we get a pretty good  
15 sample. By default, we normally use about 5,000  
16 particles per scenario. You can go up to 10,000  
17 particles per scenario. And that gives you a pretty  
18 broad sample of what the possible drift trajectories  
19 are.

20 Doesn't give you all of them, and no one of  
21 those particles, of course, is going to follow exactly  
22 what the real object does. But you get this large  
23 sampling, and that gives you a pretty good idea of  
24 where you need to go look.

25 MR. WEBB: The environmental data, how do

1 you gather the environmental data?

2 MR. FROST: As part of the SAR Ops project,  
3 we had what we call an environmental data server  
4 developed. We call it the EDS. Its sole job is to go  
5 to those agencies and institutions that run  
6 environmental circulation models, both oceanographic  
7 for currents and atmospheric for wind, and draw those  
8 products in, and then provide whatever portion we need  
9 -- because some of them are global-scale products;  
10 we've got the whole world represented -- on demand.

11 When somebody runs a SAR Ops case, they,  
12 basically after they've defined their scenarios and the  
13 amount of time -- starting time, ending time, the  
14 region that they're looking at -- that kind of gives  
15 them a space-time cube. A box of space, latitudes and  
16 longitudes, and then some period of time. We go to the  
17 environmental data server and say, we need winds and  
18 currents for this time.

19 And the user can pick from a menu as to  
20 which products they want to use. Primary product  
21 providers are NOAA, U.S. Navy unclassified products,  
22 and then we have some university products in there as  
23 well for certain small regional areas. NOAA also has a  
24 hierarchy; they've got regional models as well as  
25 global models. And so we've got all that in there.

**NEAL R. GROSS**

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1           MR. [REDACTED] This is Lt. [REDACTED] Is the EDS  
2 development part of the 2.0 version? Or has that been  
3 --

4           MR. FROST: That's been there since the  
5 beginning.

6           MR. [REDACTED] Okay.

7           MR. FROST: And like SAR Ops itself, we're  
8 on an evolutionary-type development where it's under  
9 continuous improvement all the time. So we're getting  
10 -- sometimes it's adding products; sometimes it's  
11 improving data access or speed or whatever. Sometimes  
12 we have to make changes because the provider changes  
13 either the format or the resolution of their product.  
14 Obviously we have to make changes on our side to  
15 accommodate that. So they're very much together, and  
16 they're both presently managed out of C3CEN.

17           MR. WEBB: So with the development, what are  
18 the known limitations for SAR Ops, for drift modeling?

19           MR. FROST: Well, the biggest reason we have  
20 SAR Ops, and the biggest reason we're using a Monte  
21 Carlo model is because there's a lot of uncertainty in  
22 the real world. The environmental data we get is not  
23 precise. It has a fair amount of uncertainty  
24 associated with it.

25           Part of a search object's drift is leeway,

1 which is how it responds when the wind blows against  
2 the exposed surface and moves it through the water.  
3 There's a lot of uncertainty in how even the craft that  
4 we've gone out and tested respond to the wind, let  
5 alone those that we haven't tested and we're just  
6 approximating off of the ones that we have.

7           So it's limited in the sense that we cannot  
8 -- and this is a real-world limitation -- what you're  
9 really trying to do most of the time is, we're looking  
10 for a tiny, tiny solid object suspended at the  
11 turbulent interface between two huge fluid masses: the  
12 ocean and the atmosphere. And so there's a lot of  
13 uncertainty in which way things are going to go. And  
14 so that is one limitation when it comes to search  
15 planning.

16           There's other limitations. Again, our  
17 detection data has a lot of uncertainty in it. We tend  
18 not to worry about the uncertainty piece of that too  
19 much, because we've got what we think are some fairly  
20 good average values to use in terms of detection  
21 parameters; it's called sweep width. I can give my  
22 sweep width lecture if you'd like, or not.

23           MR. WEBB: When it comes to environmental  
24 limitations in dealing with the El Faro and the winds  
25 that were involved with that, and the sea state, what

1 are the limitations that SAR Ops has when it comes to  
2 that kind of -- a large storm like that with high winds  
3 and high seas?

4 MR. FROST: Well, when I looked at the SAR  
5 Ops vector plot of the winds, the structure of the  
6 hurricane was very, very evident. When you looked at  
7 the magnitudes of the vectors, they were quite a bit  
8 smaller than what was being reported.

9 And that's not a SAR Ops function; that's  
10 the data we were getting from NOAA, from their  
11 products, and the Navy as well. In fact, I compared  
12 the different products, and it was hard to get any of  
13 them anywhere near the maximum values that were being  
14 reported.

15 MR. WEBB: What were the speeds that were  
16 getting shown?

17 MR. FROST: Most of the time, it was under  
18 100 knots. Getting anything up to 80 knots or better -  
19 - finding a product that had things like that -- we  
20 have a symbology in SAR Ops on those wind barbs, which  
21 does change at -- I don't remember; I think it's 75 or  
22 better or something like that. They will change if you  
23 give it that kind of data. We just weren't getting  
24 that kind of data.

25 MR. WEBB: So is that data then able to be



1 taken into the actual drift model? Say if you got 100  
2 knots of wind, can SAR Ops calculate that into a drift?

3 MR. FROST: I think SAR Ops will calculate  
4 with it; I don't think the results are going to be  
5 worth a darn, because we have no idea how objects  
6 behave at wind speeds like that. Never been tested.  
7 There's no physical models that I know of that you can  
8 plug numbers into and even come up with a prediction of  
9 how they would behave.

10 MR. WEBB: So it's not necessarily the  
11 environmental data crunching in there; it's the search  
12 object characteristics that are the problem?

13 MR. FROST: Yes. And I think that, again,  
14 on a good day, we're talking about the small ship at  
15 the turbulent interface. In the middle of a hurricane,  
16 all kinds of things can happen. For example, life  
17 rafts can go airborne easily. And that would not show  
18 up in our leeway calculations, because we're just  
19 plugging big numbers into a formula that's not geared  
20 for that. We're geared down in the 20 to 30, maybe 40  
21 knot range. You start talking 100 knots, and lots of  
22 strange and wonderful things start happening out there.

23  
24 So it's -- I wouldn't have any faith in the  
25 predictions. As far as crunching numbers, it's a

1 computer; it'll crunch numbers all day long.

2 MR. WEBB: So because there's been a lot of  
3 discussion about this, so the actual architecture of  
4 SAR Ops is a calculator of the wind speed and current,  
5 even in hurricane condition, is pretty sound.

6 MR. [REDACTED] Can I back that question up? So  
7 you were -- this is Lt. [REDACTED] -- you were saying that  
8 you were getting wide variations in the environmental  
9 data that you were getting at that time before the  
10 hurricane in terms of wind speeds?

11 MR. FROST: Well, the data looked internally  
12 consistent, but when you compared the values with what  
13 you were hearing on the radio or the television, or  
14 seeing probably out of the National Hurricane Center,  
15 which as far as I know, we don't have any direct  
16 connections. I don't think we get any model data from  
17 them.

18 And whether they have specialized models for  
19 the hurricanes that they provide to anybody or else or  
20 not, I don't know. I don't know the answer to that.

21 MR. WEBB: So there's nothing -- no EDS that  
22 has a hurricane center --

23 MR. FROST: Not that I'm aware of. Not that  
24 I'm aware of. And again, you can -- like any formula,  
25 you can put garbage into it, and you'll get garbage

1 out. So if we try to calculate leeway for 100-knot  
2 winds, I've got no faith in the results at all.

3 MR. WEBB: Okay. So --

4 MR. [REDACTED] This is Lt. [REDACTED] again. I have  
5 another question. Is there an opportunity in SAR Ops  
6 to override that EDS data? Could you manually put in  
7 the wind speed?

8 MR. FROST: Yes, you can. But it's a very  
9 poor substitute. The reason is, we can only put in  
10 data on a timeline. We can't put in geographic data  
11 where we've got a vector field.

12 We say that, well here, the wind's doing one  
13 thing, here it's doing something else, here it's doing  
14 something else, here it's doing something else, all at  
15 the same time. All we can do is say, at 1200Z, the  
16 wind was doing this.

17 MR. [REDACTED] In this one location?

18 MR. FROST: Well, essentially it applies it  
19 to the whole world. But yes.

20 MR. WEBB: There isn't a sensor that -- I'm  
21 thinking Essol D and B (phonetic), if you drop one near  
22 the storm, what's the limits on the data for the Essol  
23 D and B?

24 MR. FROST: I don't recall the required  
25 operational parameters. But I don't think they're

1 required. I don't think we've got anything on there  
2 that says they have to operate in those conditions.  
3 And in all likelihood, they probably wouldn't. They'd  
4 be getting tossed around by the waves to the point  
5 where --

6 MR. WEBB: Good background on that. So  
7 coming to the first day of the El Faro case, and John,  
8 when were you first notified that they were having  
9 issues with SAR Ops?

10 MR. FROST: I don't recall exactly, but I  
11 believe it was day two.

12 MR. WEBB: Day two?

13 MR. FROST: I think they were into the, I  
14 believe, the Charlie drift.

15 MR. WEBB: So Alpha and Bravo, they were  
16 able to complete successfully?

17 MR. FROST: Correct.

18 MR. FURUKAWA: This is John Furukawa, NTSB.  
19 What's Charlie drift?

20 MR. FROST: SAR Ops works in what we call --  
21 we have what's called a case, which is an overall  
22 piece. And then we have what we call a run, and the  
23 first run would be Alpha run. The second run would be  
24 the Bravo run.

25 So each time the operator decides to do

1 what's called a subsequent search, meaning they would  
2 plan for a certain period of time, they would consider,  
3 okay, I want to either change something or add  
4 different inputs, they would do what's called a  
5 subsequent search. And then we also recommend they do  
6 a subsequent search at day/night boundaries.

7           So when you're changing from daytime  
8 searching to nighttime searching, we recommend they do  
9 a subsequent search, because they get a new set of  
10 environmental data.

11           MR. SQUIRES: And sensors.

12           MR. FROST: And sensors -- the sensors are  
13 different that they're searching with.

14           MR. SQUIRES: The Alpha Bravo Charlie  
15 sequence comes from the way Coast Guard has been  
16 numbering searches for the last 50, 60 years since  
17 World War II. So I mean, and back in the day when we  
18 were only searching in daylight, there was the Alpha  
19 day, the Bravo day, the Charlie day.

20           Now, of course, we've got night vision  
21 goggles and we end up searching around the clock. But  
22 that old numbering system still persists.

23           MR. WEBB: So you got notified on day two,  
24 and can you explain or give me some details on what the  
25 problems that they were having at SAR Ops?

1 MR. FROST: To be honest, I don't exactly  
2 recall what specific problem they were having. The  
3 software did have a number of common issues at the  
4 time. And based on looking back, those appear to be  
5 some of those issues. But I don't remember exactly  
6 what it was.

7 MR. WEBB: What were the common issues.

8 MR. FROST: I'm sorry?

9 MR. WEBB: What were the common issues that  
10 were going on with SAR Ops? This is after 2.0 has been  
11 --

12 MR. FROST: Released.

13 MR. WEBB: Released, that this occurred?

14 MR. FROST: Correct. 2.0 was released in  
15 July, the end of July. And this happened in September.  
16 So SAR Ops is a fully redundant system, and it's broken  
17 up into different server suites. So typically,  
18 district 7 would use the East Coast suite, which is at  
19 Chesapeake, Virginia.

20 We also have suites in St. Louis, Missouri,  
21 Seattle, Washington, New Orleans, Alaska, Hawaii, and  
22 Guam. Two in Alaska, one in Hawaii, one in Guam. So  
23 typically, district 7 would use the East Coast suite.  
24 Sometimes if the operator experienced a problem, they  
25 would move to another suite.

1           At that time, 2.0 went to what we call a  
2 distributed database. We have a large database that  
3 replicates throughout the Coast Guard, so that a user,  
4 regardless of where they log into, will have access to  
5 their case data, which was something they did not have  
6 in previous versions.

7           We had a problem with the replication that,  
8 if you started a case on the East Coast and went to the  
9 central, there was a problem with the replication. The  
10 case would sometimes get corrupted and require  
11 intervention to do that. There was a number of those  
12 cases that happened right around that time.

13           MR. WEBB: Do you know if the D-7 guys, did  
14 they try different servers on their own?

15           MR. FROST: District 7 did that; yes.

16           MR. WEBB: On their own?

17           MR. FROST: Yes.

18           MR. WEBB: And you don't know why they went  
19 off the East Coast server?

20           MR. FROST: I don't, because we asked them  
21 to not do that unless they called us. And one of the  
22 reasons we asked them to call us, because if they're  
23 having a problem, somebody else is having a problem.  
24 We like to --

25           MR. WEBB: And that happened on day two that

1 they were doing that?

2 MR. FROST: I'm not exactly sure. But I  
3 believe so.

4 MR. WEBB: So they called up and they were  
5 having problems. What kind of support did you guys  
6 provide them?

7 MR. FROST: Again, I don't know exactly, but  
8 the typical support structure would be, we would log  
9 into the system, we would join their session, look at  
10 the error they're receiving and fix them one way or  
11 another, either by helping them reconstruct the case if  
12 that was the problem, or by fixing it. Again, I don't  
13 recall exactly what the errors were that district 7 was  
14 having.

15 MR. WEBB: Do you recall whether or not you  
16 guys reconstructed the case files, or was it --

17 MR. FROST: We did later on. I do recall  
18 that exactly, later on we did reconstruct it for them.  
19 They had two copies of the case and we put it together  
20 for one. With that replication issue I mentioned  
21 earlier, there was -- we have a process called archive  
22 and restore, which is where you archive the case off to  
23 preserve it in its current state, and then you can  
24 restore it in the event that there's a problem.

25 Sometimes they would -- it was an issue if



1 you created a case on place on one suite, and archived  
2 it on another. There were problems with restoring.  
3 That was also a common issue at the time.

4 MR. WEBB: So when you archive it and  
5 restore it, you have to go back to the same server that  
6 you archived it in?

7 MR. FROST: Correct.

8 MR. WEBB: Was that widely known, then, at  
9 the change from 1.4 to 2.0?

10 MR. FROST: That problem was discovered, I  
11 believe, in -- actually it was discovered about the  
12 first month it was deployed. So beginning of August,  
13 it was discovered. And we let the field know that.

14 MR. WEBB: You sent out a SMEF?

15 MR. FROST: I don't know if it was a SMEF  
16 advisory of it was via email. But a user group was  
17 notified. Chances are, it went out as a SMEF, but I  
18 don't recall at the time.

19 MR. WEBB: Do you recall how many times you  
20 guys were contacted by D-7 with issues during that  
21 period of time from, say, the second through the end of  
22 the case?

23 MR. FROST: I do not.

24 MR. WEBB: Was it more than one or two  
25 times?

1           MR. FROST: I know it was more than twice,  
2 but I don't remember how many.

3           MR. WEBB: Was it the same recurring issues?  
4 Or did they start having other issues with it, too?

5           MR. FROST: I don't remember.

6           MR. WEBB: After the case was done, and the  
7 archive file -- I know I tried to personally view it  
8 and everything -- there were issues with the first  
9 (unintelligible) missile (phonetic), sort of an archive  
10 there. And then there was a problem with it; you  
11 couldn't find it the file. Can you explain what  
12 happened?

13           MR. FROST: Initially you couldn't find the  
14 file because when we went from 2.0 to the next patch  
15 up, 2.01, that required a change in database. So our  
16 database could not be brought forward. So we had to --  
17 we preserved all the old databases, and when Paul went  
18 and logged on the system and looked, that particular  
19 case was not there. So what we had to do was bring up  
20 the previous version, point it at the old database, and  
21 recover the data, recover the case.

22           We could see the case, but then we could not  
23 archive and restore it because of the problems I  
24 mentioned earlier, because it was dealt with on  
25 different server suites. So we programmatically went

1 in and put the data back together. We had all the data  
2 pieces; we just had to assemble it together so it could  
3 be restored properly.

4 MR. WEBB: Eventually it was, but another  
5 thing I noticed when I was in there, and I talked to  
6 Cordell (phonetic), was that the actual drift particles  
7 were not in; it was just the search patterns. Has the  
8 drift particles been put back into the --

9 MR. FROST: The particles are recreated when  
10 the case is restored. So the simulator is rerun, and  
11 the particles are then put back in.

12 MR. WEBB: So they would be there -- if you  
13 were going to look at the case again, you could see the  
14 actual drift (inaudible)? The last file I looked at  
15 about a month and a half ago didn't have it in there.

16 MR. FROST: I'm not sure which file you  
17 looked at. But I do know that the one we had provided  
18 initially had particle data for each one.

19 MR. SQUIRES: It is repeatable; we do not  
20 receive the random number generator. We maintain the  
21 same seeds, so --

22 MR. FROST: So you get the same answer every  
23 time.

24 MR. SQUIRES: So you get the same answer  
25 every time.

1           MR. WEBB: So it doesn't matter -- if you go  
2 back a year from now and called up that archived file  
3 that all the drift model --

4           MR. FROST: It should produce exactly the  
5 same probability grids that they were looking at at the  
6 time.

7           MR. WEBB: And as you're upgrading SAR Ops,  
8 I know that in the past, a lot of times when you  
9 changed from 1.4 to 2.0, you can't call up to 1.4. Are  
10 you still needing to run SAR Ops 2.0 server to view  
11 that? Or with the 2.03, are you able to call up a case  
12 that's in the 2.0 database?

13          MR. FROST: We're doing better. I don't  
14 think we can do 2.0, but I believe, if I understand  
15 correctly, when we go from 2.02 to 2.03, everything's  
16 just going to come on across, and we shouldn't have  
17 that particular issue.

18          MR. SQUIRES: We have backwards  
19 compatibility from 2.02 to 2.03. From 2.0, we would  
20 probably have to pull up a 2.0 client to be able to --  
21 the case may come in, and it may view, but I don't know  
22 at the time what exactly we may have. And that's why  
23 we keep all the previous versions.

24          MR. FROST: And 1.4 wasn't on a database at  
25 all; we were still using flat files. So there's no way

1 that you're going to bring that up to a 2-point-  
2 anything. You'll have to run it on 1.4 box.

3 MR. WEBB: Can you explain that, the  
4 difference between a 1.4 and a 2.0?

5 MR. FROST: As far as the data storage?

6 MR. WEBB: Yes. How the data is stored.

7 MR. FROST: He can probably do a better job  
8 than I can, but it's -- we were using just regular  
9 Microsoft Windows flat files, just files with data in  
10 them, as opposed to a database, where you're organized,  
11 relational database. You've got lots of tables and  
12 it's just an entirely different breed of cat.

13 MR. SQUIRES: It is a different breed of  
14 cat, but it's kind of half-right. So under 1.4, there  
15 was what we called a personal geodatabase. So the  
16 database only for that particular case, located on the  
17 particular server you're working on. It was not shared  
18 in any way, shape or form.

19 So there was a small database that went with  
20 it that ArcMap would access to gain data. But it  
21 wasn't a large -- now it's a larger SQL database that's  
22 replicated, and there's much more going on.

23 MR. WEBB: Were there issues when you made  
24 that shift? Because it's a pretty dramatic shift.

25 MR. FROST: There were some.

1 MR. WEBB: Issues with the new database?

2 MR. SQUIRES: There was; yes.

3 MR. WEBB: And what kind of issues were  
4 those?

5 MR. FROST: Some of them were archive  
6 restores. Some of them were mostly around that  
7 replication scheme, because that was something we  
8 hadn't done before. Mostly it was archive restore.  
9 Occasionally users would get an access error, that kind  
10 of thing.

11 MR. WEBB: In general now, since 2.0 came  
12 out and now we have versions after that, the stability  
13 of the SAR Ops system itself, where does it stand  
14 compared to that initial release?

15 MR. FROST: In my view, it's an order of  
16 magnitude. On top of just the database and the SAR Ops  
17 piece, the Coast Guard has become very centric to the  
18 IT security world. So with 2.0, not only did we get a  
19 new database, a new set of code and a new version of  
20 ArcMap, but we also got a whole new set of security  
21 controls that were never applied to 1.4. So all of  
22 those things were kind of dumped in all at once.

23 And some of the issues we saw were unknown  
24 during testing, and we discovered afterwards and fixed.  
25 And now we've become more comfortable with the security

1 controls. We've modified the software. Things are  
2 much more stable.

3 MR. SQUIRES: I haven't noticed any issues  
4 for quite a while, actually.

5 MR. FROST: We have some network issues  
6 today still. Some users have issues getting in. We  
7 have profile issues. We had --

8 MR. WEBB: How about running of a SAR Ops  
9 now? Have you had any cases that -- nothing's going to  
10 match the El Faro, obviously, but have you had any  
11 cases that have multiple drifts, any problems with  
12 those where a sector or district will call up and say,  
13 hey --

14 MR. FROST: We've had some large cases, but  
15 none -- no huge reported problems that I'm aware of.  
16 Some of the problems we get are, they can't access an  
17 EDS product or that kind of thing. Either network or  
18 product's not available. But the case access errors  
19 and stuff that we used to have, we don't have  
20 (Unintelligible).

21 MR. WEBB: Any cases disappearing off the  
22 server?

23 MR. FROST: Not unless they're operator-  
24 intervened.

25 MR. WEBB: What does that mean?

1           MR. FROST: Meaning an operator will  
2 accidentally -- so now what happens is, if an operator  
3 right clicks and deletes a case, it doesn't really  
4 delete. It's only hidden from their view. So an  
5 administrator can go in and unhide it from their view.

6           MR. WEBB: So the data -- so basically the  
7 data in the SAR Ops server is there forever, even if  
8 it's deleted from the view of the operator?

9           MR. FROST: In the database, yes.

10          MR. SQUIRES: I don't think it's forever, is  
11 it?

12          MR. WEBB: Or until --

13          MR. SQUIRES: We have to do some garbage  
14 collection, or we'll run out of space.

15          MR. FROST: As of right now, we have not  
16 removed any case data. We have moved databases  
17 forward, so they've been emptied from, like mentioned  
18 earlier, from 2.0 to 2.1. We've created a new database.  
19 But since we've gone to 2.02, we've been on the same  
20 database, and when we move to 2.03, we'll keep the same  
21 data moving forward.

22          MR. WEBB: So when you clean out the data,  
23 just --

24          MR. FROST: We haven't done anything yet.

25          MR. WEBB: If you do, you're cleaning out --



1 are you cleaning out cases? Or are you cleaning out  
2 practice runs and tests and things like that?

3 MR. FROST: If we clean it out, we would  
4 start with any -- so we mark the case -- in the  
5 database, you mark what type of case it is, whether  
6 it's training, testing, operational, law enforcement,  
7 or search and rescue operational -- SAR. We would  
8 start with, say, training cases. But we have not taken  
9 any data out of the database as of yet.

10 MR. SQUIRES: And that's one capability that  
11 came with shifting over to a database, was the ability  
12 to classify, better classify these cases as to what  
13 they really were. For one thing, we just want to get  
14 some statistics of how much SAR Ops is being used for  
15 this, that and the other.

16 MR. WEBB: I think I don't have much else.

17 MR. FURUKAWA: Jack, I think you said that  
18 earlier that you -- wind speeds were reported at 80 to  
19 100 knots. But that the product, I guess the NOAA or  
20 the Navy products were giving you different speeds. Is  
21 that --

22 MR. FROST: The speeds that we were getting  
23 from the Navy and from NOAA, as they appeared in SAR  
24 Ops, were smaller than what I was listening to as being  
25 the sustained winds, for example, on the radio reports

1 of what was going on with the hurricane.

2           Now, part of that may have been a difference  
3 between knots and miles per hour; I don't know about  
4 that. I didn't really do that careful a conversion.  
5 But we were clearly much smaller than what was going on  
6 out there. And I think you've talked to Art Allen, and  
7 I suspect he addressed this issue. If he didn't -- but  
8 basically what happens is, we're getting these winds,  
9 and they're kind of average over some period of time,  
10 like a few hours.

11           So even if the hurricane sort of looks like  
12 it's sitting in one place, it's probably jiggling  
13 around. And so what they're measuring, I think, is  
14 what are the sustained winds relative to the center of  
15 the storm, wherever that center may be? Whereas what  
16 we're getting is, what are the average winds relative  
17 to a geographic point? Because that's what we get out  
18 of the models. It's just gridded data, is what it is.  
19 It's on a specific grid.

20           MR. SQUIRES: One thing you asked about the  
21 winds, the operator is provided a warning if the winds  
22 are in excess of 30 knots, and sea state in excess of  
23 25 feet.

24           MR. WEBB: You know what the warnings say?

25           MR. SQUIRES: Warning just says we have no -

1 -

2 MR. FROST: We have no faith in our  
3 computations.

4 MR. SQUIRES: The computations are not  
5 tested for anything greater than that. It will accept  
6 them, like Jack said, and your limitations of the  
7 algorithms are what Jack said. But initially  
8 (Inaudible) work, I told him -- I gave him the same  
9 answer Jack did and said, okay, you just don't test for  
10 that. It doesn't mean you won't get an answer. But  
11 the answer could be suspect.

12 MR. FURUKAWA: So John, the warnings were  
13 greater than 30 knots for wind, and what else?

14 MR. SQUIRES: Twenty-five foot for seas.

15 MR. FURUKAWA: Twenty-five foot seas. Okay.  
16 And Jack, do you remember off the top of your head if  
17 you were getting reported 80 to 100 knots of wind, what  
18 the products were giving you? The smaller values?

19 MR. FROST: No. All I recall is that we  
20 were in the -- around 80 knots when the reports from  
21 other sources were well over 100. I was trying to get  
22 the wind speed -- the ones right there next to the eye  
23 -- I was going and clicking on each one, because we can  
24 do that.

25 We've got a query tool there, and you just

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1 click on the barb and it will tell you what its value  
2 is in knots, and what the direction is. And I was just  
3 clicking around, looking for the biggest one I could  
4 find, and I couldn't find any that big.

5 MR. FURUKAWA: Finding 80-ish, but you were  
6 getting reports of over 100?

7 MR. FROST: Yes.

8 MR. WEBB: A statement, just tell me if this  
9 is true or not. This is what I've heard now for  
10 months, that SAR Ops does not work for winds over 40  
11 knots, or vessels -- and they have no data for vessels  
12 over 300 feet. That's kind of -- in the operator  
13 world, that's kind of the chatter.

14 MR. FROST: Depends on what you mean by  
15 works. The reason that we would say that SAR Ops  
16 doesn't work for winds over 40 knots is because the  
17 Coast Guard doesn't have any leeway data for anything  
18 for winds over 40 knots. We can't program what we don't  
19 know. Now, we can plug those numbers into the formulas  
20 that we've developed for lesser wind speeds and see  
21 what happens.

22 But again, as I said before, I don't have a  
23 lot of faith in those results, because they've never  
24 been tested. So to say it doesn't work, no; SAR Ops  
25 will, quote, work. It'll compute. It's just that the

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1 answers are going to be suspect because we don't have  
2 any formulas to put into SAR Ops for those wind speeds.  
3 All we can do is use the formulas we got for the low-  
4 end wind speeds, and plug high winds into them, and  
5 cross our fingers.

6           As for the 300 foot limitation, that's more  
7 of a sweep width detection issue. Because we don't  
8 really have any data on detecting aircraft carriers,  
9 either, because we don't go searching for aircraft  
10 carriers. So probably the leeway equations will work  
11 all right. If a 300-foot merchant vessel and a 1,000-  
12 foot merchant vessel, I don't know if the leeway's  
13 going to be that much different one to the other.  
14 Detection-wise, it would be quite a substantial  
15 difference, but we don't have any data to support any  
16 sweep width values for the larger numbers; 300 is about  
17 as high as we go.

18           So a lot of these limitations aren't SAR Ops  
19 limitations; they're information limitations that we  
20 don't have to put into SAR Ops. If we had it, we'd put  
21 it in. But we don't have it.

22           MR. WEBB: Do you think, is there a need to  
23 have that data? Or is the -- with the hurricanes  
24 coming around once in a while, is there a need for --

25           MR. FROST: First of all, we're probably not

1 going to be searching in a hurricane. You heard what  
2 happened to the 130 we sent out there that tried to get  
3 in and couldn't.

4 MR. WEBB: But there's places without  
5 hurricanes that have high winds and high seas.

6 MR. FROST: Yeah.

7 MR. WEBB: Is there any thought of trying to  
8 get more data at those higher levels?

9 MR. FROST: There's no projects that I'm  
10 aware of. Search and rescue hasn't asked for any that  
11 I know of. I don't know that anybody's actually asked  
12 for any. The R&D center was probably the place where  
13 you'd go for that, because that's where all of our  
14 other leeway and detection data was developed, back in  
15 the day.

16 You might want to look at the possibility of  
17 doing some kind of physical modeling, but I don't even  
18 know that anybody's got any way to ground to a physics-  
19 based model under those kind of conditions, because  
20 that's pretty wild. The real world's a complicated  
21 place.

22 MR. FURUKAWA: Do you have anything else?

23 MR. WEBB: No. I think I got it.

24 MR. FURUKAWA: Okay, well thank you very  
25 much. And before we end the interview, I'll first start

1 off with you, Jack. Is there anything that you'd like  
2 to add or change?

3 MR. FROST: I don't think so. You asked me  
4 about limitations. Probably large numbers of search  
5 craft would be a limitation for the search planner,  
6 planner piece. So you get probably above a half dozen,  
7 and it's going to take it a long time to do an  
8 optimization.

9 We rarely have those kinds of searches, and  
10 there's -- I'm sure I can find workarounds for it. But  
11 that would be a pretty massive search.

12 MR. FURUKAWA: Are there any questions that  
13 we should have asked you but did not?

14 MR. FROST: Don't think so.

15 MR. FURUKAWA: Do you have any suggestions  
16 for preventing a recurrence or an accident like this?

17 MR. FROST: The only suggestion I have is to  
18 tell the skippers, don't poke your nose into  
19 hurricanes.

20 MR. FURUKAWA: And for you, MR. SQUIRES, is  
21 there anything else that you'd like to add or change?

22 MR. SQUIRES: No.

23 MR. FURUKAWA: Are there any questions that  
24 we should have asked but did not?

25 MR. SQUIRES: I don't believe so.

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1 MR. FURUKAWA: Do you have any suggestions  
2 for preventing a recurrence or an accident like this?

3 MR. SQUIRES: No, not really.

4 MR. FURUKAWA: Okay, then that's it. And it  
5 is 1520 on Wednesday, June 15, 2016. And we're ending  
6 the interview with Mr. Jack Frost and Mr. John Squires.

7 (Whereupon, the above-entitled interview  
8 went off the record at 3:20 p.m.)  
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C E R T I F I C A T E

MATTER: El-Faro Incident  
October 1, 2015  
Accident No. DCA16MM001  
Interview of John Frost & John Squires

DATE: 06-15-16

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